**Acta Biol. Debr. Oecol. Hung 31: 69–81, 2013**

# CONTRIBUTION TO THE CHIRONOMIDAE (DIPTERA) FAUNA OF THE SAJÓ/SLANÁ RIVER, HUNGARY AND SLOVAKIA

**A. MÓRA[1]* – L. POLYÁK[2] – A. FARKAS[3]**

[1]Hungarian Academy of Sciences, Centre for Ecological Research, Balaton Limnological Institute, Klebelsberg Kunó 3, H-8237 Tihany, Hungary
[2]Department of Ecology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary
[3]Department of Hydrobiology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary
* Corresponding author, e-mail: mora.arnold@okologia.mta.hu

## ADATOK A SAJÓ/SLANÁ ÁRVASZÚNYOG-FAUNÁJÁHOZ (DIPTERA: CHIRONOMIDAE)

**MÓRA ARNOLD[1] – POLYÁK LÁSZLÓ[2] – FARKAS ANNA[3]**

[1]MTA Ökológiai Kutatóközpont, Balatoni Limnológiai Intézet, 8237 Tihany, Klebelsberg Kunó út 3.
[2]Debreceni Egyetem, Ökológiai Tanszék, 4032 Debrecen, Egyetem tér 1.
[3]Debreceni Egyetem, Hidrobiológiai Tanszék, 4032 Debrecen, Egyetem tér 1.

**ABSTRACT:** In April 2012 chironomid pupal exuviae were collected at 13 sites along the Sajó River and at one site along the Bábony stream. Additionally, larvae were collected at a further site near the spring. The collected 12 larvae belonged to five species level taxa. During samplings 10 013 exuviae were collected, 9545 from the Sajó River and 468 from the Bábony stream. A total of 110 species level taxa were identified as exuviae. One species was only found as larvae, accordingly a total of 111 taxa were recorded. Three species (*Limnophyes spinigus, Orthocladius pedestris* and *Chironomus prasinus*) proved to be new to Slovakian fauna, while four species (*Corynoneura carriana, Eukiefferiella tirolensis, Orthocladius rivinus* and *Orthocladius ruffoi*) are new to the Hungarian fauna. As a final conclusion it can be stated that the chironomid fauna of the Sajó River is very rich with many rare and, in faunistical point of view, important species.

**Keywords:** exuviae, faunistics, Sajó, Slaná, Bábony stream

**KIVONAT**: 2012 áprilisában árvaszúnyog-exuviumokat gyűjtöttünk 13 mintavételi helyen a Sajó teljes szakaszán, és a Bábony-patak egy pontján. Emellett egy további helyen, a forrás közelében lárvákat is gyűjtöttünk. A gyűjtött 12 lárva öt faji szintű taxonba tartozott. A mintavételek során 10 013 bábbőrt gyűjtöttünk, 9545-öt a Sajóból és 468-at a Bábony-patakból. Összesen

110 faji szintű taxont azonosítottunk exuvium alakban. Egy faj csak lárva alakban került elő, így összesen 111 taxon előfordulását bizonyítottuk. Három faj (*Limnophyes spinigus, Orthocladius pedestris* and *Chironomus prasinus*) a szlovák, négy faj (*Corynoneura carriana, Eukiefferiella tirolensis, Orthocladius rivinus* and *Orthocladius ruffoi*) a magyar faunára újnak bizonyult. Eredményeink alapján megállapítható, hogy a Sajó árvaszúnyogfaunája kiemelkedően gazdag, számos ritka, faunisztikai szempontból fontos fajjal.

**Kulcsszavak**: exuvium, faunisztika, Sajó, Slaná, Bábony-patak

## Introduction

The Sajó River (Slaná in Slovakian) has been in the centre of public interest for a long time, being one of the most industrialized and most polluted rivers in Hungary and Slovakia (FEHÉR et al. 1999). In the 1990's, due to the changes in industrial technologies, the water pollution has considerably decreased. However, the ecological state of the river has remained "good" and "medium". The Bábony stream, an inflow of the Sajó River, also suffers severe pollutions, including heavy metals and organic compounds, as a result of various industrial activities (FICSÓR 2011).

Our knowledge on the aquatic macroinvertebrate assemblages of the Sajó River has been limited (see FARKAS et al. 2013; POLYÁK et al. 2013). Particularly few data are available on the chironomid fauna. Only larval data have been published from the Slovakian section of the river (MIŠÍKOVÁ ELEXOVÁ et al. 2010). In this work 48 taxa were listed, but only 18 were identified to species level due to that a lot of species are undescribed, cannot or hardly can be distinguished as larvae. The other taxa were identified to species group or genus level. From the Hungarian section of the Sajó River only sporadic data on the occurrence of five species have so far been published (MÓRA et al. 2005; SZÍTÓ 1981, 2001, 2002), while no data are available on the chironomids of the Bábony stream.

In this paper new occurrence data for the chironomid fauna of the Sajó River and the Bábony stream are presented, mostly based on collections of pupal exuviae and partly based on collections of larvae.

## Materials and methods

The chironomid pupal exuviae were collected between 19 and 23 April 2012, at 13 sites (SAJ02–14) along the whole length (excluding the spring) of Sajó River and at one site along the Bábony stream (BÁB01). Samples were taken according to the European Standard EN 15196 (2006). Additionally, larvae were collected by standard pond net at a further site (SAJ01), near the spring (Fig. 1, Table 1). Exuviae and larvae were preserved in 70% ethanol. Later all specimens were prepared and mounted on microscope slides for detailed investigations. Larvae were identified using the keys by JANECEK (1998) and WIEDERHOLM (1983). Keys and descriptions by EKREM (2004), LANGTON & VISSER (2003) and STUR & EKREM (2006) were used for identification of exuviae. The nomenclature follows SÆTHER & SPIES (2012) for species names and LANGTON & VISSER (2003) for pupal exuvial forms.

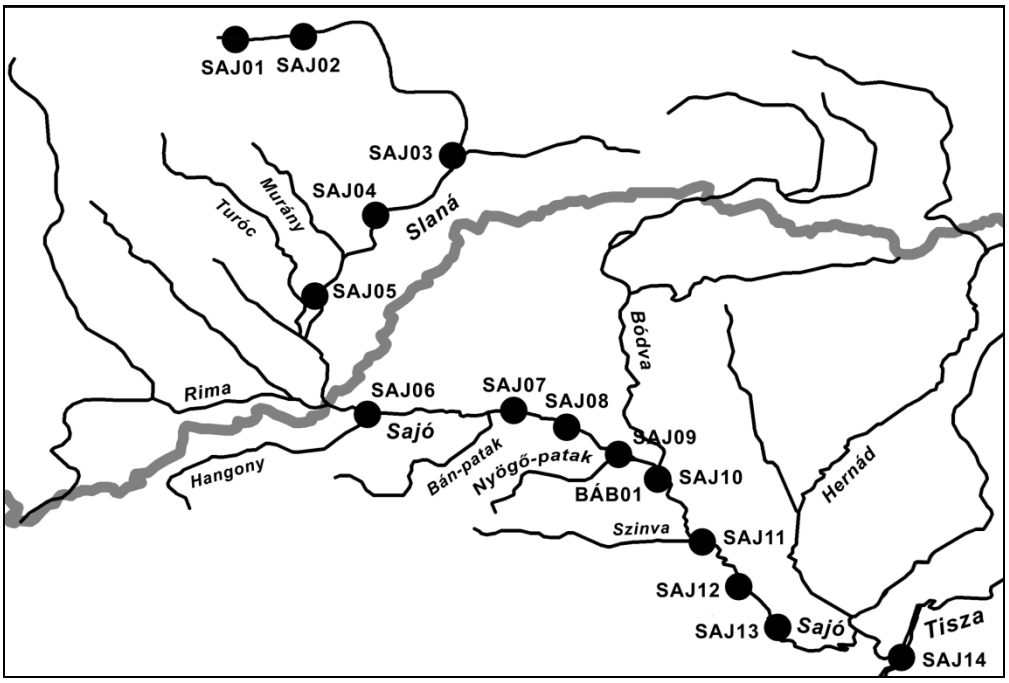


**Fig. 1.** Sampling sites along the Sajó River and the Bábony stream (for codes see Table 1; BÁB01 and SAJ10 are very close to each other and are shown by the same mark).

**Table 1.** Sampling sites along the Sajó River and at Bábony stream with the samplings date in April 2012 and geo-coordinates.

| Code | Sampling sites | Date | Latitude (N) | Longitude (E) |
|---|---|---|---|---|
| SAJ01 | Slaná, near the spring (Rejdová) | 19.04. | 48°47'05.39" | 20°12'19.67" |
| SAJ02 | Slaná (Rejdová) | 19.04. | 48°47'20.57" | 20°17'53.06" |
| SAJ03 | Slaná (Brzotín) | 20.04. | 48°37'37.18" | 20°30'02.20" |
| SAJ04 | Slaná (Plešivec) | 20.04. | 48°32'45.07" | 20°23'46.25" |
| SAJ05 | Slaná (Gemer) | 20.04. | 48°26'10.42" | 20°18'48.56" |
| SAJ06 | Sajó (Sajónémeti) | 21.04. | 48°16'30.12" | 20°23'05.16" |
| SAJ07 | Sajó (Sajókaza) | 21.04. | 48°16'50.13" | 20°35'01.02" |
| SAJ08 | Sajó (Berente) | 21.04. | 48°15'28.19" | 20°39'20.77" |
| SAJ09 | Sajó (Sajószentpéter) | 22.04. | 48°13'14.97" | 20°43'34.67" |
| SAJ10 | Sajó (Sajókeresztúr) | 22.04. | 48°11'14.65" | 20°46'47.23" |
| SAJ11 | Sajó (Miskolc) | 22.04. | 48°06'06.92" | 20°50'24.36" |
| SAJ12 | Sajó (Sajópetri) | 22.04. | 48°02'26.87" | 20°53'21.42" |
| SAJ13 | Sajó (Köröm) | 23.04. | 47°59'07.97" | 20°56'32.63" |
| SAJ14 | Sajó, Tiszaszederkény (Tiszaújváros) | 23.04. | 47°56'40.96" | 21°06'38.24" |
| BÁB01 | Bábony stream (Sajóecseg) | 22.04. | 48°11'14.82" | 20°46'44.27" |

## Results and discussion

*Larval data*

Twelve larvae belonging to five taxa were collected near the spring, in 19 April 2012. Among them *Parametriocnemus stylatus* was the dominant (7 specimens). Further three larvae were identified to species level: two specimens of *Brillia bifida* and the only specimen of *Pseudodiamesa (Pseudodiamesa) branickii* (Nowicki, 1873). The latter species was found only as larvae during this study. Furthermore, two larvae, *Heleniella* sp. and *Orthocladius (Symposiocladius)* sp. were identified to genus (subgenus) level due to that many species belonging to these taxa are undescribed or cannot be distinguished as larvae. The occurrence of *Heleniella ornaticollis* (Edwards, 1939) in the Sajó River at Rozsnyó/Rožňava was mentioned by MIŠÍKOVÁ ELEXOVÁ et al. (2010), while we found exuviae of *H. serratosioi* at Pelsőc/Plešivec (Table 2); both species can occur in the spring. Similarly, MIŠÍKOVÁ ELEXOVÁ et al. (2010) recorded *Orthocladius (Symposiocladius) lignicola* Kieffer, 1914 from Sajópüspöki, while we collected *O. (S.) ruffoi* from the Sajó River at Sajóréde/Rejdová and Sajónémeti and also from the Bábony stream (Table 2). Since the sampling site at Sajóréde is close to the spring, it is possible that the collected larval specimen belongs to *O. (S.) ruffoi.*

*Exuvial data*

During samplings 10 013 pupal exuviae were collected: 9545 in the Sajó River (site to site ranging from 280 to 1511) and 468 in the Bábony stream. A total of 110 species level taxa belonging to five subfamilies were recorded (9 Tanypodinae, 6 Diamesinae, 2 Prodiamesinae, 56 Orthocladiinae and 38 Chironominae). The number of species ranged from 21 to 55 at the sites along the Sajó River and was 24 in the Bábony stream (Table 2). Three species (*Conchapelopia pallidula, Psectrotanypus varius* and *Eukiefferiella claripennis*) were only found in the Bábony stream.

In some cases the species level identification was not possible. The taxonomy of *Procladius* is still unclear and the majority of species belonging to this genus cannot be distinguished by morphological characters. However, the description of exuviae (LANGTON & VISSER 2003) of *Procladius choreus* is appropriate for identification. Besides those belonging to *P. choreus*, further exuviae of another *Procladius (Holotanypus)* sp. with distinctive exuvial characters were collected, but these were not identifiable due to insufficient keys. The exuviae of *Chironomus* sp. and *Cladotanytarsus* sp. could also not be identified exactly, but clearly differed from the other species of that genus. One taxon, *Thienemanniella* pe2b, could be identified as pupal exuvial form (LANGTON & VISSER 2003). This form includes two or more species which are not distinguishable as exuviae.

*The chironomid fauna of the Sajó River and the Bábony stream*

According to the Fauna Europaea Database (SÆTHER & SPIES 2012) three species (*Limnophyes spinigus*, *Orthocladius pedestris* and *Chironomus prasinus*) proved to be new to the Slovakian fauna, while four species (*Corynoneura carriana, Eukiefferiella tirolensis, Orthocladius rivinus* and *Orthocladius ruffoi*) are new in the Hungarian fauna (see MÓRA 2012). Among them only *E. tirolensis* was listed as species expected to occur in Hungary (see MÓRA & DÉVAI 2004).

Beyond the new species to the Hungarian fauna many rare taxa (recorded from only few sites in Hungary) were found. Among them those only recorded from one site are mentioned here. *Cricotopus cylindraceus* was only known from Kis-

Balaton (SZÍTÓ 1994). *Rheopelopia maculipennis* and *Microtendipes britteni* was only recorded from the River Zala (MÓRA et al. 2008). Four species (*Orthocladius ashei, O. rivicola, Tvetenia verralli* and *Tanytarsus eminulus*) were most recently collected in the Szentendrei-Duna (MÓRA & FARKAS 2012). The occurrence of a further species, *Diamesa insignipes*, was based on nearly 50-year-old data in Hungary: larvae of this species were collected in Visegrád Mountains and Torna Karst in 1964 (BERCZIK 1968). Accordingly, the new record of this species from the Bábony stream is an important result in faunistical point of view.

This study revealed a rich chironomid fauna in the Sajó River. Due to our results are based on a single spring collection, much more species could be expected to occur in the river. A similar high number of species was recorded from Hungarian rivers, the Upper-Tisza (MÓRA et al. 2006) and the Szentendrei-Duna (MÓRA & FARKAS 2012), as well as from Slovakian rivers, the River Hron (BITUŠÍK et al. 2006) and the River Nitra (BITUŠÍK & ZÁBORSKÁ 1999). However, these comparisons must be taken into consideration with reservations due to the different water types, sampling methods and sampling frequencies.

Unfortunately, no data are available before and from the period of water pollution, thus the changes in chironomid assemblages cannot be revealed. However, based on the high number of chironomid taxa and the diverse assemblages, a good water quality can be presumed in the whole length of the Sajó River.

## Acknowledgments

This study was supported by the BioFresh EU FP7 research program, the OTKA K106133 and OTKA CNK80140 grants. We would like to express our thanks to János Tamás Kundrát for his help during the field work.

## References

BERCZIK, Á. (1968): Zur Kenntnis der bachbewohnenden Chironomiden Ungarns. – Acta zoologica Academiae Scientarium Hungaricae 14/1–2: 15–25.

BITUŠÍK, P. – SVITOK, M. – DRAGÚŇOVÁ, M. (2006): The actual longitudinal zonation of the river Hron (Slovakia) based on chironomid assemblages (Diptera, Chironomidae). – Acta Universitatis Carolinae Biologia 50: 5–17.

BITUŠÍK, P. – ZÁBORSKÁ, V. (1999): Využitie pakomárov (Diptera: Chironomidae) na indikáciu znečistenia horného úseku rieky Nitra a riečky Handlovka [Using chironomid pupal exuviae (Diptera: Chironomidae) for indication of pollution of the upper section of the river Nitra and its tributary Handlovka]. – Acta Facultatis Ecologiae 6: 141–149.

EKREM, T. (2004): Immature stages of European *Tanytarsus* species I. The *eminulus*-, *gregarius*-, *lugens*- and *mendax* species groups (Diptera, Chironomidae). – Mitteilungen aus dem Museum für Naturkunde in Berlin, Deutsche entomologische Zeitschrift 51/1: 97–146.

EN 15196 (2006): Water quality. Guidance on sampling and processing of the pupal exuviae of Chironomidae (Order Diptera) for ecological assessment. – European Committee for Standardization, Brussels, 9 pp.

FARKAS, A. – POLYÁK, L. – MÓRA, A. – LENGYEL, SZ. (2013): A Sajó szitakötő-faunája (Odonata). – Acta Biologica Debrecina Supplementum Oecologica Hungarica 31: 27–39.

FEHÉR, J. – GALAMBOS, I. – LEHOCZKI, ZS. (1999): Water quality management options for a downstream transboundary river basin – the Sajó river case study. – Water Science and Technology 40/10: 95–102.

FICSÓR, M. (2011): Adatok a folyami szitakötők (Odonata: Gomphidae) északkelet-magyarországi előfordulásához lárvavizsgálatok alapján. – Acta Biologica Debrecina Supplementum Oecologica Hungarica 26: 67–74.

JANECEK, B.F.R. (1998): Diptera: Chironomidae (Zuckmücken). Bestimmung von 4. Larvenstadien mitteleuropäischer Gattungen und österreichischer Arten. In: Fauna Aquatica Austriaca V. – Kursmaterial, Universität für Bodenkultur, Abteilung Hydrobiologie, Wien

LANGTON, P.H. – VISSER, H. (2003): Chironomidae exuviae. Key to pupal exuviae of the West Palaearctic Region. In: World Biodiversity Database CD-ROM Series. – Multimedia Interactive Software 1.0., Expert Center for Taxonomic Identification, University of Amsterdam, Amsterdam

MIŠÍKOVÁ ELEXOVÁ, E. – HAVIAR, M. – LEŠŤÁKOVÁ, M. – ŠČERBÁKOVÁ, S. – BITUŠÍK, P. – BULÁNKOVÁ, E. – ČEJKA, T. – ČIAMPOROVÁ-ZAŤOVIČOVÁ, Z. – DERKA, T. – HAMERLÍK, L. – ILLÉŠOVÁ, D. – KODADA, J. – KOŠEL, V. – KRNO, I. – MLÁKA, M. – NOVIKMEC, M. – ŠPORKA, F. (2010): Zoznam zistených taxónov na monitorovaných lokalitách vodných útvarov povrchových vôd Slovenska. Časť 1. Bentické bezstavovce. – Acta Environmentalica Universitatis Comenianae (Bratislava) 18/1: 5–335.

MÓRA, A. (2012): Az árvaszúnyogok (Diptera: Chironomidae) hazai fajainak névjegyzéke. Version 2012.05.01. – http://www.mavige.hu/dokument/hungarian_chironomid_checklist.pdf

MÓRA, A. – BODA, P. – CSABAI, Z. – CSER, B. – DEÁK, CS. – HORNYÁK, A. – JAKAB, T. – KÁLMÁN, Z. – KECSŐ, K. – KOVÁCS, T.Z. – PAPP, L. – POLYÁK, L. – SOÓS, N. (2008): A Zala és befolyói makroszkopikus gerinctelen faunája. – Acta Biologica Debrecina Supplementum Oecologica Hungarica 18: 123–180.

MÓRA, A. – BODA, P. – CSABAI, Z. – DEÁK, CS. – MÁLNÁS, K. – CSÉPES, E. (2005): Contribution to the mayfly, aquatic and semiaquatic bug, aquatic beetle, caddisfly and chironomid fauna of the River Tisza and its main inflows (Ephemeroptera, Heteroptera: Nepomorpha and Gerromorpha, Coleoptera: Hydradephaga and Hydrophiloidea, Trichoptera, Diptera: Chironomidae). – Folia Historico-naturalia Musei Matraensis 29: 151–164.

MÓRA, A. – DÉVAI, GY. (2004): Magyarország árvaszúnyog-faunájának (Diptera: Chironomidae) jegyzéke az előfordulási adatok és sajátosságok feltüntetésével. – Acta Biologica Debrecina Supplementum Oecologica Hungarica 12: 39–207.

MÓRA, A. – FARKAS, A. (2012): The Chironomidae (Diptera) fauna of the Szentendrei-Duna, Hungary. – Acta Biologica Debrecina Supplementum Oecologica Hungarica 28: 129–140.

MÓRA, A. – TÓTH, M. – DEBRECENI, Á. – CSÉPES, E. (2006): Adatok a Felső-Tisza árvaszúnyog-faunájához (Diptera: Chironomidae). – Folia Historico-naturalia Musei Matraensis 30: 253–261.

POLYÁK, L. – COZMA, N.J. – KUNDRÁT, J.T. – MÓRA, A. – LENGYEL, SZ. (2013): Újabb lárvaadatok a Sajó tegzesfaunájához (Trichoptera). – Acta Biologica Debrecina Supplementum Oecologica Hungarica 31: 83–94.

SÆTHER, O.A. – SPIES, M. (2012): Fauna Europaea: Chironomidae. In: BEUK, P. – PAPE, T. (eds.): Fauna Europaea: Diptera, Nematocera. Fauna Europaea version 2.5. − http://www.faunaeur.org (last visited 3 February 2013)

STUR, E. – EKREM, T. (2006): A revision of West Palaearctic species of the *Micropsectra atrofasciata* species group (Diptera: Chironomidae). – Zoological Journal of the Linnean Society 146: 165–225.

SZITÓ, A. (1981): Environmental factors influencing the abundance of Chironomid larvae (Chironomida lárvák abundanciáját befolyásoló környezeti tényezők a Tiszában.) – Tiscia 16: 191–203.

SZÍTÓ, A. (1994): Az árvaszúnyog fajok szerepe a Hídvégi-tó táplálkozási kapcsolataiban. In: MHT XII. Országos Vándorgyűlés, Siófok, 1994. május 17–19. I. kötet. – Magyar Hidrológiai Társaság, Budapest, p. 309–318.

SZÍTÓ, A. (2001): A Tisza és mellékfolyóinak üledékfaunája a cianid szennyezés előtt és után. – Halászatfejlesztés 26: 86–98.

SZÍTÓ, A. (2002): Az üledékfaunát alkotó életközösség állapota a Tiszában a cianid szennyezés után a hossz-szelvény vizsgálatok alapján 2000-ben. – Hidrológiai Közlöny 82: 130–133.

WIEDERHOLM, T. (ed.) (1983): Chironomidae of the Holarctic region. Keys and diagnoses. Part 1. Larvae. – Entomologica scandinavica, Supplement 19: 1–457.

**Table 2.** List of Chironomidae species of the Sajó River and the Bábony stream collected as exuviae in 2012, with the exact numbers of specimens (for codes see Table 1).

| Sampling sites / Taxa | SAJ02 | SAJ03 | SAJ04 | SAJ05 | SAJ06 | SAJ07 | SAJ08 | SAJ09 | SAJ10 | SAJ11 | SAJ12 | SAJ13 | SAJ14 | BÁB01 | összesen |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tanypodinae | | | | | | | | | | | | | | | |
| *Conchapelopia melanops* (Meigen, 1818) | | | | | | 1 | 2 | | | | | | | | **3** |
| *Conchapelopia pallidula* (Meigen, 1818) | | | | | | | | | | | | | | 3 | **3** |
| *Macropelopia nebulosa* (Meigen, 1804) | | | 1 | | | | 3 | | | | | | | | **4** |
| *Procladius (H.) choreus* (Meigen, 1804) | | | | | 2 | 2 | 1 | | | 2 | | | | 2 | **9** |
| *Procladius (Holotanypus)* sp. | | | | | | | | | | | | | 8 | | **8** |
| *Psectrotanypus varius* (Fabricius, 1787) | | | | | | | | | | | | | | 1 | **1** |
| *Rheopelopia maculipennis* (Zetterstedt, 1838) | | | | | | | | | | | 3 | | | | **3** |
| *Rheopelopia ornata* (Meigen, 1838) | | | | | | | | | | | 9 | 1 | | | **10** |
| *Tanypus (T.) punctipennis* Meigen, 1818 | | | | | | | 7 | | | | | | | | **7** |
| Diamesinae | | | | | | | | | | | | | | | |
| *Diamesa insignipes* Kieffer, 1908 | | 21 | | | | | | | | | | | | 1 | **22** |
| *Diamesa laticauda* Serra-Tosio, 1964 | | 5 | | | | | | | | | | | | | **5** |
| *Diamesa tonsa* (Haliday, 1856) | | 43 | | | | | | | | | | | | | **43** |
| *Potthastia gaedii* (Meigen, 1838) | | | | | | | | | | 6 | 17 | | | | **23** |
| *Potthastia longimanus* Kieffer, 1922 | | | 2 | 1 | | | | 2 | | 1 | 19 | 2 | | | **27** |
| Prodiamesinae | | | | | | | | | | | | | | | |
| *Odontomesa fulva* (Kieffer, 1919) | | 1 | 19 | 1 | | | | | | | | | | | **21** |

| Sampling sites / Taxa | SAJ02 | SAJ03 | SAJ04 | SAJ05 | SAJ06 | SAJ07 | SAJ08 | SAJ09 | SAJ10 | SAJ11 | SAJ12 | SAJ13 | SAJ14 | BÁB01 | összesen |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Prodiamesa olivacea* (Meigen, 1818) | | 1 | 128 | 22 | 40 | 41 | 145 | 68 | 14 | 2 | 7 | | | 2 | **470** |
| Orthocladiinae | | | | | | | | | | | | | | | |
| *Brillia bifida* (Kieffer, 1909) | 2 | | 1 | | | | | | | | | | | | **3** |
| *Brillia longifurca* Kieffer, 1921 | | | 1 | | | 6 | | 18 | 3 | 1 | 27 | 3 | | | **59** |
| *Cardiocladius fuscus* Kieffer, 1924 | | | | | 3 | | | 1 | | 5 | 19 | 8 | 1 | | **37** |
| *Corynoneura carriana* Edwards, 1924 | | | | | | | 1 | | 2 | 6 | 9 | 2 | 8 | | **28** |
| *Corynoneura gratias* Schlee, 1968 | | | 17 | 8 | | | | | | | | | | | **25** |
| *Cricotopus (C.) albiforceps* (Kieffer, 1916) | | | | | | | | | | | 2 | | | | **2** |
| *Cricotopus (C.) annulator* Goetghebuer, 1927 | | 12 | 26 | 65 | 102 | 41 | 3 | 3 | 10 | 24 | 58 | 9 | 8 | | **361** |
| *Cricotopus (C.) bicinctus* (Meigen, 1818) | | 17 | 13 | 8 | 21 | 9 | 5 | 1 | 4 | 3 | 51 | 23 | 15 | 1 | **171** |
| *Cricotopus (C.) curtus* Hirvenoja, 1973 | | 19 | 276 | 302 | 49 | 30 | 6 | 6 | 3 | 39 | 77 | 21 | 9 | | **837** |
| *Cricotopus (C.) cylindraceus* (Kieffer, 1908) | | | | | 1 | 3 | 1 | 1 | 1 | 3 | 10 | 3 | | | **23** |
| *Cricotopus (C.) similis* Goetghebuer, 1921 | | | | 1 | | 1 | | | | | | | | | **2** |
| *Cricotopus (C.) tremulus* (Linnaeus, 1758) | | 433 | 229 | 68 | 3 | 2 | | | | | | | | | **735** |
| *Cricotopus (C.) triannulatus* (Macquart, 1826) | | | | | 169 | 23 | 1 | 11 | 36 | 61 | 103 | 24 | 6 | 2 | **436** |
| *Cricotopus (C.) trifascia* Edwards, 1929 | | | | | 19 | | | | | | 10 | 24 | | | **53** |
| *Cricotopus (C.) tristis* Hirvenoja, 1973 | | | | | 6 | 3 | | 1 | 2 | 9 | 2 | | | | **23** |
| *Cricotopus (C.) vierriensis* Goetghebuer, 1935 | | | | | 1 | 21 | 5 | | 5 | 5 | 29 | 35 | | 1 | **102** |
| *Cricotopus (I.) sylvestris* (Fabricius, 1794) | | | | | | | | | 1 | | | | 1 | 12 | **14** |
| *Eukiefferiella brevicalcar* (Kieffer, 1911) | | 1 | 34 | 220 | 19 | 2 | | | | 5 | | | | | **281** |

| Sampling sites / Taxa | SAJ02 | SAJ03 | SAJ04 | SAJ05 | SAJ06 | SAJ07 | SAJ08 | SAJ09 | SAJ10 | SAJ11 | SAJ12 | SAJ13 | SAJ14 | BÁB01 | összesen |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Eukiefferiella claripennis* (Lundbeck, 1898) | | | | | | | | | | | | | | 1 | **1** |
| *Eukiefferiella clypeata* (Thienemann, 1919) | | | 3 | 5 | | | | | | | | | | | **8** |
| *Eukiefferiella devonica* (Edwards, 1929) | 12 | 8 | 58 | 106 | 3 | | | | | | | | | | **187** |
| *Eukiefferiella fuldensis* Lehmann, 1972 | 1 | | | | | | | | | | | | | | **1** |
| *Eukiefferiella gracei* (Edwards, 1929) | | 2 | | 1 | 3 | | | | | | | | | | **6** |
| *Eukiefferiella minor* (Edwards, 1929) | 1 | | | | | | | | | | | | | | **1** |
| *Eukiefferiella tirolensis* Goetghebuer, 1938 | 2 | 1 | 7 | | | 1 | | | | | | | | | **11** |
| *Heleniella serratosioi* Ringe, 1976 | | | 16 | | | | | | | | | | | | **16** |
| *Heterotrissocladius marcidus* (Walker, 1856) | | | 2 | | | | | | | | | | | | **2** |
| *Hydrobaenus distylus* (Potthast, 1914) | | | | | | | | | | | | | 1 | | **1** |
| *Limnophyes spinigus* Sæther, 1990 | | | 1 | | | | | | | | | | | | **1** |
| *Nanocladius (N.) dichromus* (Kieffer, 1906) | | | | | | | | | | 6 | 12 | 16 | 32 | 1 | **67** |
| *Nanocladius (N.) parvulus* (Kieffer, 1909) | | | 6 | 4 | | | | | | | | | | | **10** |
| *Nanocladius (N.) rectinervis* (Kieffer, 1911) | | 2 | 3 | 4 | | 2 | | | 1 | 2 | | | | | **14** |
| *Orthocladius (Eud.) fuscimanus* (Kieffer, 1908) | | 1 | | | | | | | | | | | | | **1** |
| *Orthocladius (Euo.) ashei* Soponis, 1990 | 27 | 3 | 2 | 2 | 2 | | | | | | | | | | **36** |
| *Orthocladius (Euo.) rivicola* Kieffer, 1911 | 1 | 7 | 2 | 11 | 1 | | | | | 2 | 26 | 5 | | | **55** |
| *Orthocladius (Euo.) thienemanni* Kieffer, 1906 | | 1 | 4 | | 13 | 18 | 12 | 2 | 18 | 20 | 50 | 10 | | 419 | **567** |
| *Orthocladius (M.) frigidus* (Zetterstedt, 1838) | 4 | | | | | | | | | | | | | | **4** |
| *Orthocladius (O.) glabripennis* (Goetghebuer, 1921) | | 4 | 12 | | 11 | 2 | 43 | 1 | 10 | 7 | 116 | 16 | 2 | 5 | **229** |

| Sampling sites / Taxa | SAJ02 | SAJ03 | SAJ04 | SAJ05 | SAJ06 | SAJ07 | SAJ08 | SAJ09 | SAJ10 | SAJ11 | SAJ12 | SAJ13 | SAJ14 | BÁB01 | összesen |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Orthocladius (O.) oblidens* (Walker, 1856) | | 2 | | | 3 | 2 | 3 | | 1 | 1 | 20 | 4 | | 1 | **37** |
| *Orthocladius (O.) pedestris* Kieffer, 1909 | | | 10 | 1 | 16 | 13 | 30 | | | | 1 | 1 | | 1 | **73** |
| *Orthocladius (O.) rhyacobius* Kieffer, 1911 | 8 | 146 | 137 | 12 | 2 | 1 | 1 | | | 1 | 2 | 1 | | | **311** |
| *Orthocladius (O.) rivinus* Potthast, 1914 | | | 1 | | 2 | 12 | 3 | 1 | 3 | 1 | 4 | | | | **27** |
| *Orthocladius (O.) rubicundus* (Meigen, 1818) | 8 | 140 | 341 | 197 | 50 | 17 | 4 | 4 | 7 | 3 | 6 | | 1 | | **778** |
| *Orthocladius (O.) wetterensis* Brundin, 1956 | | | 2 | 1 | 4 | 9 | 2 | | | 3 | 15 | | | | **36** |
| *Orthocladius (S.) ruffoi* Rossaro & Prato, 1991 | 1 | | | | 1 | | | | | | | | | 1 | **3** |
| *Paracladius conversus* (Walker, 1856) | | | | | 4 | | | | | 1 | 1 | 1 | | | **7** |
| *Parametriocnemus stylatus* (Spärck, 1923) | 4 | 1 | 12 | 10 | 7 | 6 | 2 | 2 | 3 | | | | | | **47** |
| *Paratrichocladius rufiventris* (Meigen, 1830) | 1 | 5 | 4 | 5 | 15 | 10 | 18 | 1 | 10 | 19 | 33 | 4 | 1 | 1 | **127** |
| *Parorthocladius nudipennis* (Kieffer, 1908) | 1 | | | | | | | | | | | | | | **1** |
| *Rheocricotopus (Ps.) chalybeatus* (Edwards, 1929) | | | | | 10 | 2 | 1 | 1 | | 17 | 22 | 15 | | 1 | **69** |
| *Rheocricotopus (Rh.) fuscipes* (Kieffer, 1909) | 6 | 2 | 13 | 2 | | | | | | | | | | | **23** |
| *Synorthocladius semivirens* (Kieffer, 1909) | | 4 | 38 | 220 | 62 | 1 | | | | | | | | | **325** |
| *Thienemanniella* pe2b Langton, 1991 | 1 | | 1 | 2 | | | | | | | | | | | **4** |
| *Tvetenia bavarica* (Goetghebuer, 1934) | 2 | | | | | | | | | | | | | | **2** |
| *Tvetenia calvescens* (Edwards, 1929) | 79 | 9 | 37 | 183 | 366 | 18 | 3 | 5 | 14 | 13 | 7 | 1 | 1 | | **736** |
| *Tvetenia verralli* (Edwards, 1929) | | 3 | 6 | 12 | 11 | 10 | | 1 | | 6 | 15 | 9 | | | **73** |
| Chironominae | | | | | | | | | | | | | | | |
| *Chironomus (Ch.) bernensis* Klötzli, 1973 | | | | 6 | 17 | 1 | 38 | 14 | 12 | 7 | 8 | 3 | | | **106** |

| Sampling sites / Taxa | SAJ02 | SAJ03 | SAJ04 | SAJ05 | SAJ06 | SAJ07 | SAJ08 | SAJ09 | SAJ10 | SAJ11 | SAJ12 | SAJ13 | SAJ14 | BÁB01 | összesen |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Chironomus (Ch.) nudiventris* Ryser et al., 1983 | | | | | | | | 2 | 4 | | | | 1 | | **7** |
| *Chironomus (Ch.) plumosus* (Linnaeus, 1758) | | | | | | | 16 | | | | | | | | **16** |
| *Chironomus (Ch.) prasinus* Pinder, 1978 | | | 9 | 2 | 17 | 33 | 56 | 20 | 35 | 5 | 10 | 2 | | 2 | **191** |
| *Chironomus (Ch.) riparius* Meigen, 1804 | | | | | | | | | | | 2 | | | | **2** |
| *Chironomus (Chironomus)* sp. | | | | | | | | 9 | 4 | 4 | 8 | 3 | | | **28** |
| *Cryptochironomus rostratus* Kieffer, 1921 | | | | | | | | | | 1 | 1 | 1 | | | **3** |
| *Harnischia fuscimanus* Kieffer, 1921 | | | | | | | 1 | 5 | 37 | 43 | 23 | 3 | 29 | 1 | **142** |
| *Kiefferulus (K.) tendipediformis* (Goetghebuer, 1921) | | | | | | | | | | | 1 | | | | **1** |
| *Microtendipes britteni* (Edwards, 1929) | | | | | 2 | | | | | | | | | | **2** |
| *Microtendipes pedellus* (De Geer, 1776) | | | 1 | 1 | 85 | 66 | 9 | 124 | 26 | 3 | 3 | 1 | | 1 | **320** |
| *Paracladopelma laminatum* (Kieffer, 1921) | | | | | | 2 | | 1 | | | | | | | **3** |
| *Paralauterborniella nigrohalteralis* (Malloch, 1915) | | | | | | | | | | | | | 50 | | **50** |
| *Paratendipes albimanus* (Meigen, 1818) | | | | | | | | | | | 1 | | | | **1** |
| *Phaenopsectra flavipes* (Meigen, 1818) | | | | | | | | | | | 1 | | 3 | | **4** |
| *Polypedilum (Po.) laetum* (Meigen, 1818) | | | | | | | | 4 | 10 | 3 | 34 | 2 | 1 | 3 | **57** |
| *Polypedilum (Po.) nubeculosum* (Meigen, 1804) | | | | | | | 2 | 1 | 1 | 2 | 3 | | | | **9** |
| *Polypedilum (Po.) pedestre* (Meigen, 1830) | | | | | | | | | | 1 | 1 | | | | **2** |
| *Polypedilum (T.) acifer* Townes, 1945 | | | | | | | | | | | 24 | 9 | 2 | | **35** |
| *Polypedilum (U.) convictum* (Walker, 1856) | | | | | | | | | | | 1 | | | | **1** |
| *Polypedilum (U.) cultellatum* Goetghebuer, 1931 | | | | | | | | | 1 | | 20 | 4 | 23 | | **48** |

| Sampling sites / Taxa | SAJ02 | SAJ03 | SAJ04 | SAJ05 | SAJ06 | SAJ07 | SAJ08 | SAJ09 | SAJ10 | SAJ11 | SAJ12 | SAJ13 | SAJ14 | BÁB01 | összesen |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Stictochironomus pictulus* (Meigen, 1830) | | | | | | | | | 1 | | 2 | | | | **3** |
| *Cladotanytarsus (C.) mancus* (Walker, 1856) | | | | | | | 1 | | 1 | | 1 | | 1 | | **4** |
| *Cladotanytarsus (Cladotanytarsus)* sp. | | | | | | | | | | | | 1 | | | **1** |
| *Micropsectra apposita/contracta* | 2 | | | | | | | | | | | | | | **2** |
| *Micropsectra atrofasciata* (Kieffer, 1911) | 111 | 2 | 31 | 20 | | | | | | 1 | | | | | **165** |
| *Micropsectra pallidula* (Meigen, 1830) | 6 | | | | | | | | | | | | | | **6** |
| *Paratanytarsus dissimilis* (Johannsen, 1905) | | | | | | | | | | | | 1 | 1 | | **2** |
| *Paratanytarsus inopertus* (Walker, 1856) | | | | | | | | 1 | | | | | | | **1** |
| *Rheotanytarsus curtistylus* (Goetghebuer, 1921) | | | | | | 3 | | 3 | | | | | | | **6** |
| *Rheotanytarsus photophilus* (Goetghebuer, 1921) | | | | | | | | | | | | 1 | | | **1** |
| *Rheotanytarsus rhenanus* Klink, 1983 | | | | 8 | 7 | 49 | 15 | 91 | 66 | 112 | 97 | 84 | 39 | | **568** |
| *Stempellina almi* Brundin, 1947 | | | | | | | | | | | | | 3 | | **3** |
| *Tanytarsus brundini* Lindeberg, 1963 | | | | | 2 | 2 | | | 2 | 1 | 1 | | | | **8** |
| *Tanytarsus ejuncidus* (Walker, 1856) | | | | | 3 | 28 | 4 | 115 | 73 | 32 | 18 | 11 | 8 | 4 | **296** |
| *Tanytarsus eminulus* (Walker, 1856) | | | | | | 4 | | 29 | 3 | 15 | 7 | 2 | 2 | 1 | **63** |
| *Tanytarsus heusdensis* Goetghebuer, 1923 | | | | | | | | 2 | 12 | 25 | 30 | 15 | 23 | | **107** |
| *Tanytarsus pallidicornis* (Walker, 1856) | | | | | 1 | | | | | | | | | | **1** |
| **összesen** | **280** | **896** | **1506** | **1511** | **1155** | **497** | **444** | **551** | **436** | **529** | **1079** | **381** | **280** | **468** | **10013** |
| **taxonszám** | **21** | **29** | **39** | **33** | **41** | **39** | **33** | **34** | **36** | **45** | **55** | **40** | **28** | **24** | **110** |